State of Tennessee Regional Water Supply Planning Pilot Study

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Presentation Outline

- Ongoing Activities
- Regional Need Statements
- Alternatives Under Consideration
- Projected Demand vs. Existing Yield
- OASIS Modeling of Systems Reliability
- Questions and Comments

Ongoing Activities

- Data gathering completed to support:
  - ► Phase II Study Activities
    - Financial Strength of Regional Utility Systems
    - Utility Interconnection Capacity Evaluation
    - OASIS Model Development and Calibration
- Performing:
  - ► Phase III Study Activities
    - Preliminary Design of Alternative Water Sources
    - Preliminary Yield of Alternative Water Sources
    - Cost Estimates
    - Alternative Screening Protocol and Decision Matrix

Regional Need Statements

North Central Tennessee Pilot Area

- The principle water source for North Central Tennessee is Old Hickory Lake. Raw water withdrawn by White House and Gallatin Utilities satisfies approximately 90% of the existing demand in the pilot area region.
- The overall raw water demand for the North Central Tennessee pilot area is projected to increase from approximately 19 MGD to 28 MGD by 2030. Currently there is sufficient raw water to meet this demand and there are no physical limitations on finished water production for meeting mean day use. It should be noted that a charge for withdrawals from Old Hickory Lake may be instituted at some point in the future and could impact water rates across the region.
- The City of Portland satisfies its raw water demand through withdrawals from small surface water sources, and its average annual demand of approximately 2.3 MGD exceeds the firm yield of its sources. Portland purchases finished water from neighboring utilities on an as needed basis, but with no formal contracts for this outside supply, security for the system is not provided.

Regional Need Statements

Southern Cumberland Plateau Pilot Area

- The current raw water supply in the region was perceived as barely sufficient during the recent drought. The hardest hit utility, Monteagle, managed the drought by purchasing finished water through connections to Sewanee and Tracy City, and by establishing several emergency raw water sources.
- Overall raw water demand in the region is expected to grow only slightly, from approximately 2.39 MGD to 2.53 MGD, by the year 2030. Demand projections for Big Creek and Sewanee Utility Districts are well below the firm yields of their existing raw water sources. Existing and projected raw water demands for Monteagle and Tracy City, however, are currently greater than the firm yield of their primary sources. The composite firm yield of the region's existing raw water sources is barely sufficient to meet existing demand, indicating a need for additional source development.
- Interconnections between the utilities are well established, with existing formal contracts between Tracy City and Big Creek, as well as Tracy City and Monteagle. The utilities must maintain and improve this ability to share water among themselves. This is paramount to each utility's ability to meet demand during droughts, as the small drainage areas of the South Cumberland Plateau's water sources leaves them particularly vulnerable.

Alternatives Under Consideration

North Central Tennessee Pilot Area

- Optimizing Water Sharing between Utilities
- Evaluation Utilizes OASIS
  - Existing Interconnections
  - Improved Interconnections

			Contract						Rates	Flow Records	
Contract	Seller	Buyer	Max (gal per month or MGD)	Min (gal per month)	Min Pressure (psi)	Max flow (gpm)	Date Enacted	Expires	Rates $/kgal	Maximum Month	Max Day (*avg dayx1.25)*
Yes	GPU	Westmoreland	15 MG per month	750,000	20		6/1/1978	6/1/2018	$4.92	17,933,385	*747,000*
No	GPU	White House	1 MGD daily avg						$3.34	7,439,293	1,497,000
Yes	GPU	CSBWUD	1.5 MGD			1043	3/8/2007	3/8/2017	$3.18	34,093,000	1,377,000
No	WHUD	Portland	-	-					No contract	14,369,500	599,000
No	Westmoreland	Portland							No contract		
No	Westmoreland	CSBWUD							No contract	3,540,200	*147,508*

Alternatives Under Consideration

North Central Tennessee Pilot Area

- Portland's Caney Fork Creek Project
  - Earthen Embankment/Roller Compacted Concrete Dam
  - Preliminary Expected Project Yield – 2.08 MGD
  - Total Source Firm Yield – 3.20 MGD
  - Expected Release Requirement:
    - 1.73 cfs (@ .1 cfsm)
    - 1.12 MGD

Alternatives Under Consideration

Southern Cumberland Plateau Pilot Area

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			Contract Information					Rates	Flow Record	
Contract	Seller	Buyer	Max (gal per month)	Max flow (gpd)	Min Pressure	Date Enacted	Expires	Rates ($/kgal)	Maximum Month	Max gpd (*avg dayx1.25)*
Yes	BCUD	TCPU	3000000		50	9/21/2009	1 yr after first delivery	$4.05	3,165,000	105,500
No	SUD	Monteagle							951,000	126,600
Yes	TCPU	Monteagl	1750000	250000		9/20/1999		$1.19 (with > 5 days notice) $2.70 (< 5 days notice & use > 50 kgpd)	6,054,000	235,000
No	TCPU	BCUD							34,546,400	1,341,600

Alternatives Under Consideration

Southern Cumberland Plateau Pilot Area

- New Reservoir on Big Creek
  - Earthen Embankment Dam
  - Preliminary Expected Project Yield – 6.11 MGD
  - Total Source Firm Yield – 7.43 MGD
  - Expected Release Requirement :
    - 2.05 cfs (@ .1 cfsm)
    - 1.32 MGD
- Purchase of Ramsey Lake
  - Convert Existing Lake to Water Supply Source
  - Preliminary Expected Project Yield - .58 MGD
  - Total Source Firm Yield - .67 MGD
  - Expected Release Requirement :
    - .29 cfs (@ .1 cfsm)
    - .09 MGD

Alternatives Under Consideration

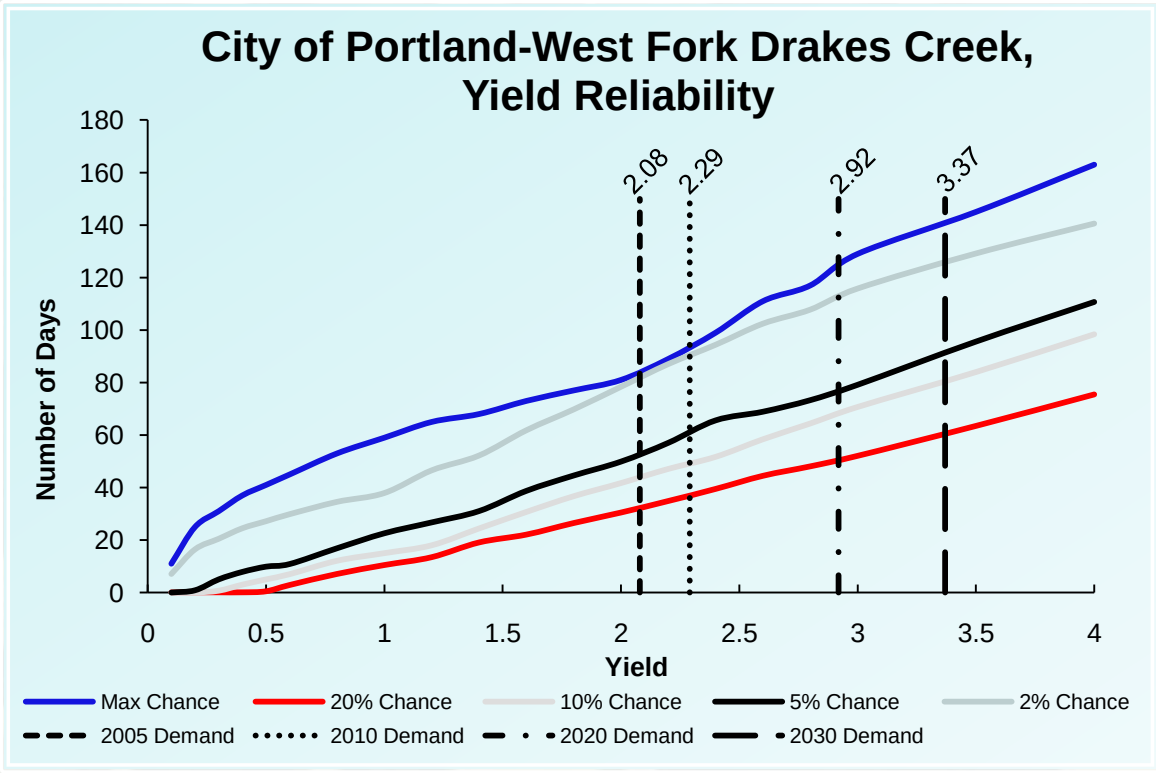
Southern Cumberland Plateau Pilot Area

- Raise Big Fiery Gizzard Lake
  - Existing Dam Raised 7 feet
  - Preliminary Expected Yield after Project - .64 MGD
  - Total Source Firm Yield – 1.28 MGD
  - Expected Release Requirement :
    - 1.0 cfs by Permit
    - With 2.2 square mile watershed @ .1 cfsm - .2 cfs = .13 MGD

- Pipeline to Watts Bar Lake (South Pittsburgh)
  - 220,000 feet of transmission line to Monteagle – In 3 Phases
  - Preliminary Expected Project Yield
    - .6 MGD – Phase I
    - 3.0 MGD – Phase II
    - Extend Services – Phase III

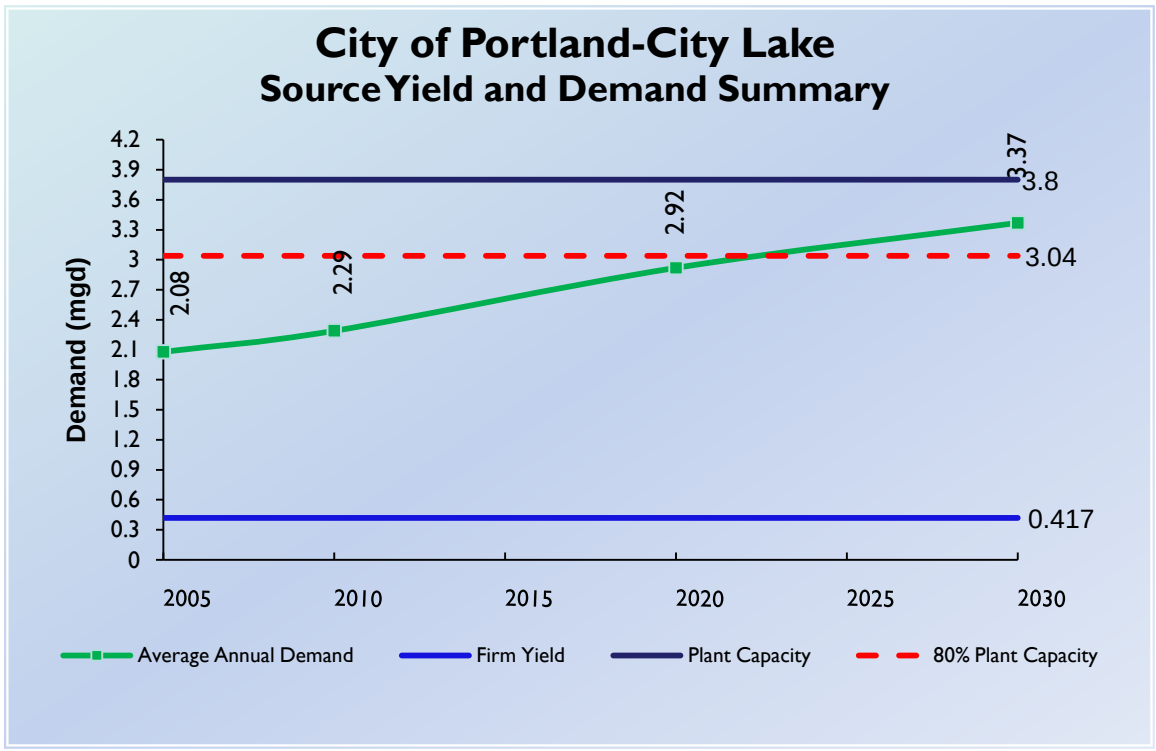
Projected Demand vs. Existing Yield

- Portland, TN
  - Current Portland average demand is 2.29 MGD
  - In the period of record, the maximum number of days, in one year, the demand was not met is ~90
  - In any given year:
    - 2%, ~87 days
    - 5%, ~60 days
    - 10%, ~45 days
    - 20%, ~37 days



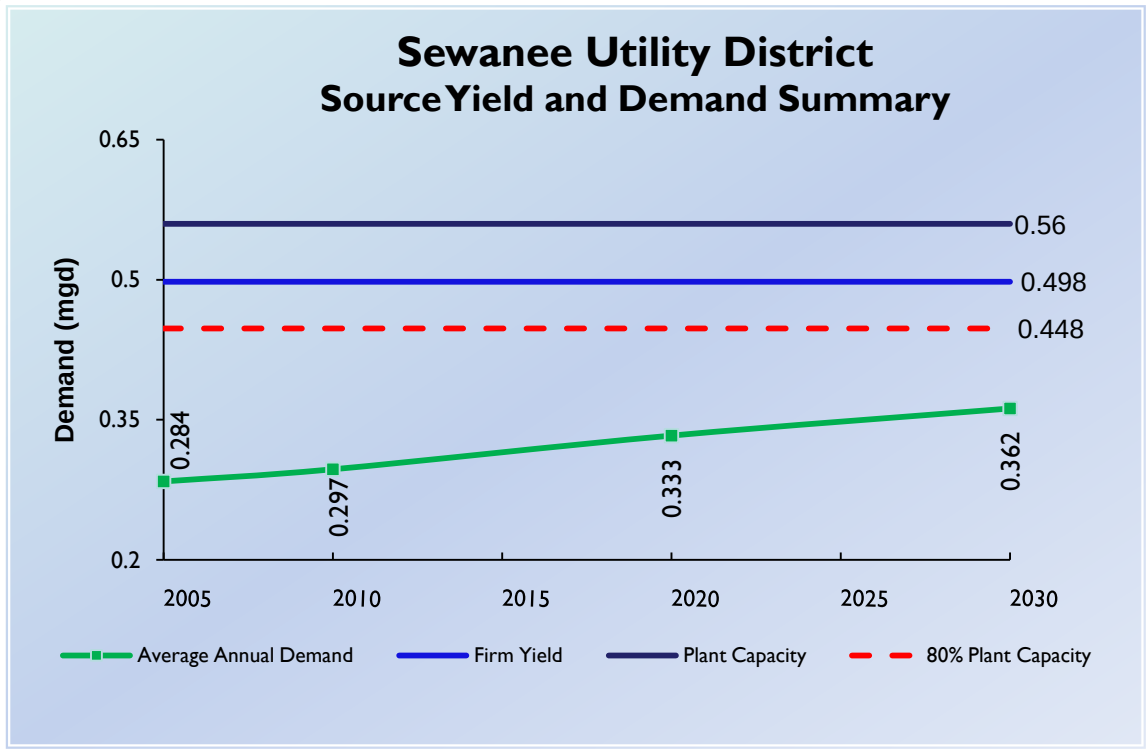
Projected Demand vs. Existing Yield

- Portland, TN
  - Current Portland average demand is 2.29 MGD
  - The estimated firm yield of City Lake is .417 MGD
  - OASIS utilized to provide a more completed evaluation of the risk to, and reliability of, Portland's system



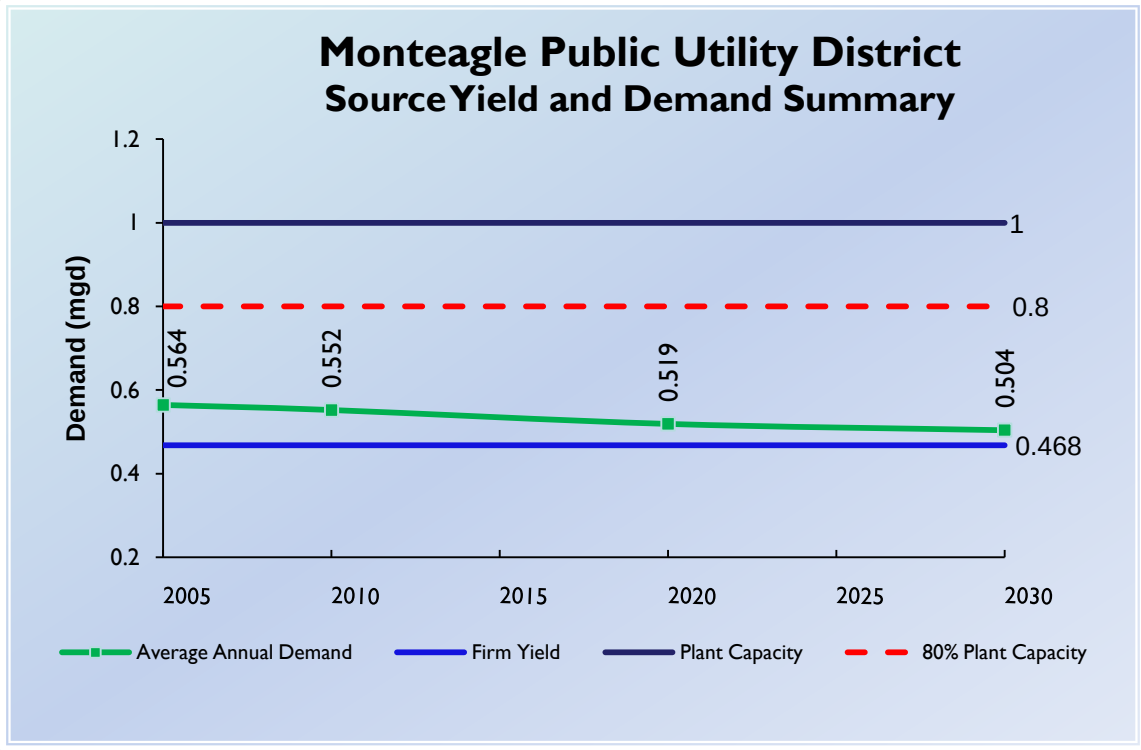
Projected Demand vs. Existing Yield

- Sewanee, TN
  - Current Sewanee average demand is .297 MGD
  - The combined firm yield of multiple sources is estimated as .498 MGD
  - On an individual basis, Sewanee UD possesses adequate source water and treatment capacity
  - Wastewater discharge limiting factor



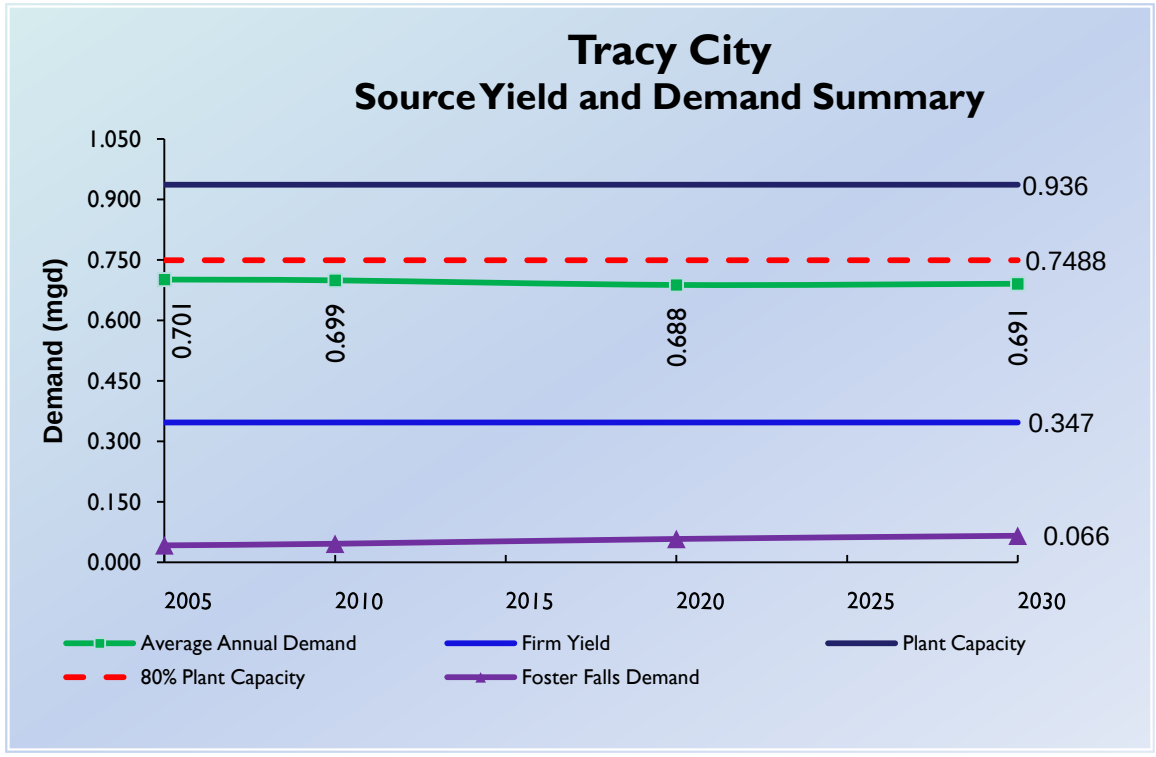
Projected Demand vs. Existing Yield

- Monteagle, TN
  - Current Monteagle average demand is .552 MGD
  - The firm yield of primary and secondary sources estimated as .468 MGD
  - Projected demand through the study period is estimated to be decreasing
  - Monteagle impacted most dramatically during recent drought



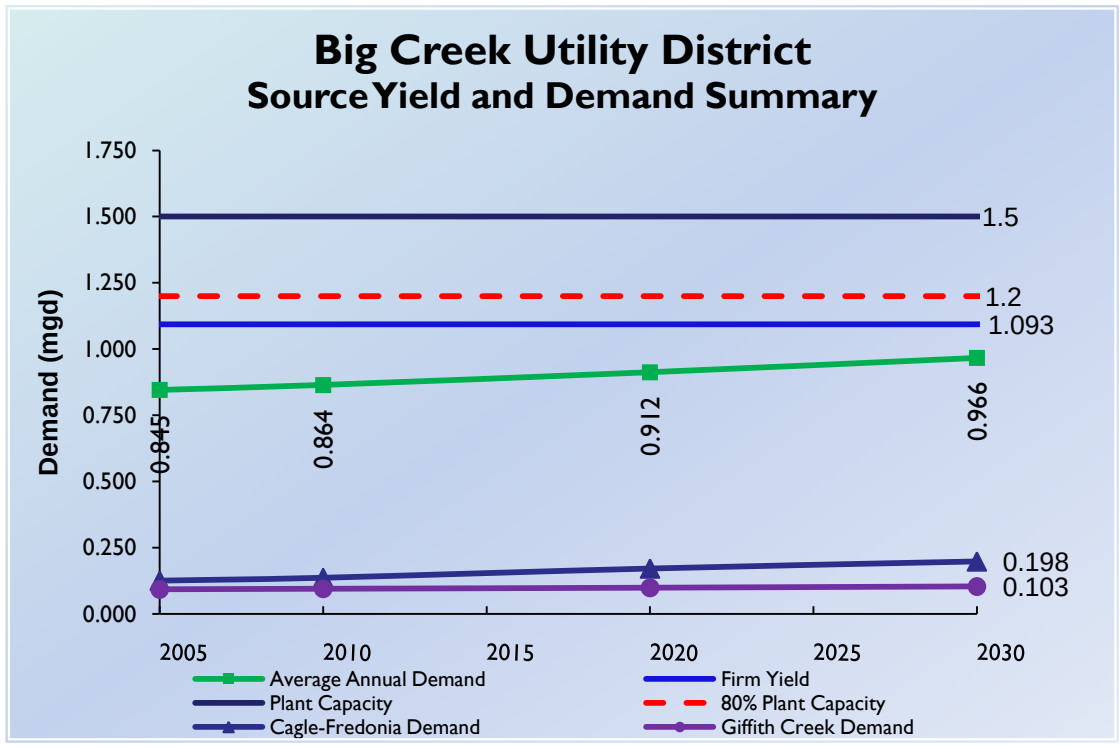
Projected Demand vs. Existing Yield

- Tracy City, TN
  - Current Tracy City average demand is .699 MGD
  - The firm yield of Big Fiery Gizzard lake estimated as .347 MGD
  - .65 MGD release required by permit for minimum flow downstream
  - .13 MGD @ .1 cfsm



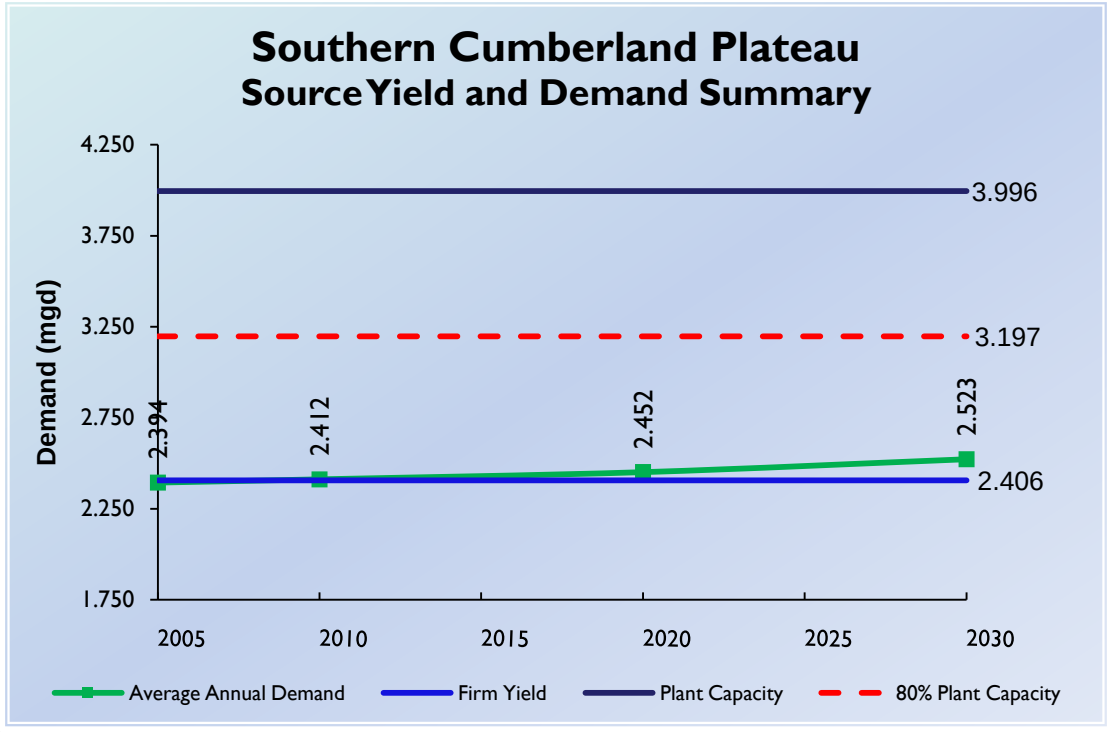
Projected Demand vs. Existing Yield

- Big Creek Utility District
  - Current Big Creek Utility District average demand is .864 MGD
  - The firm yield of Ranger Lake estimated as 1.093 MGD
  - On an individual basis, Big Creek UD possesses adequate source water and treatment capacity



Projected Demand vs. Existing Yield

- Southern Cumberland Plateau Region
  - Existing average demand for the region is 2.394 MGD, projected to reach 2.523 MGD by 2030
  - The combined firm yield of sources in the region has been estimated as 2.406 MGD
  - As a region, there is a demonstrated need for additional water



OASIS Modeling of Systems Reliability

- Optimize Yield of Existing Sources
- Evaluate Reliability of Existing Systems
  - Establish Reliability Objectives
- Scenarios
  - Base Case – 2030 Demands
  - Evaluate Drought Plans Locally
  - Evaluate Regional Cooperation – Water Sharing
  - Regional Cooperation with Local Drought Plans
  - Regional Cooperation with Regional Drought Plans
- Summary and Next Steps